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REPRINTED FROM THE
INTERSTATE MEDICAL JOURNAL
Vol. XV., Nos. 2, 3 and 4.

ST. LOUIS:
INTERSTATE MEDICAL JOURNAL CO.
1908.

THE HISTORY OF THE HOUSE; THE STRUGGLE FOR FRESH AIR AND LIGHT.*

BY GEORGE M. GOULD, M. D., of Philadelphia.

Physicians and sanitarians agree that tuberculosis and pneumonia, if not other diseases, are house-diseases. In some way these afflictions depend upon improper living of men and women in badly constructed or ill-managed houses. In fighting the causes of these diseases we are in one way or another brought back to the question of houses, ventilation, etc. But as in all other etiologies and pathologies, we can not deal intelligently with the evil, nor accurately meet the problem in our treatment, unless we know the natural history of the cause, so in this we must know the history of the house in order to understand the finished result. To teach people the use of ventilation, cleanliness, and light, we must understand the reasons why, at present, they really prefer foul air, filth and darkness. For it is true that the vast majority of people of the world do prefer dirt, disease and darkness, and the sources of that preference must be seen in order to combat the evils. Go where one will in all occidental peoples there is either an utter indifference to the need or use of pure air, clean rooms and light, or there is a genuine dislike or fear of these things. Most animals are, in a state of nature, cleanly. The hog and other wallowing animals seem to us to love filth,—which means that by wallowing they avoid the diseases conveyed by flies,, mosquitoes, etc. The savage who covers his body with paint, mud, or worse materials, accomplishes the same result in a similar way. If you go into the majority of rooms and houses of the farming, working and poorer classes of our country, you will find the windows closed, the air foul, the food in summer covered with flies, the beds infested, etc. Only history can tell us why. Habits are national, racial, even cosmical, and the longer they are in forming and fixing the harder and more protracted will be their uprooting. The habit of bad houses and of house-diseases is the oldest of human habits.

The Homeric House, like the house of all primitive peoples, was a single room. It was four-cornered, and had openings in the upper part of the walls to let in light. These, also, of course, let in air, which was not always so undersired as in more northern climes. There is thus a most real and physical reason for the great truth of the proverb, *Ex Oriente Lux*. The Eastern houses had more light in them, because built for human beings, not cattle, and because light could be had without so much cold, as in the north. The house of the chief, lord, or king, was on the top of a hill, partly for pro-

*Notes, with some of the slides reproduced, of a stereopticon talk delivered before a number of medical, public health and other societies.



FIG. 1.—The open central court of the Mediterranean house, with windowless outer walls.

tection from enemies, and about it, and stretching away below were the huts of his common people, serfs, servants and soldiers. Thus grew the *polis* or city, whence we get our own words, police, politics, political, etc. The earthly lord, in later times, became, in a way, the heavenly lord, and the hill-top kingly houses became temples. But however modified the original one-roomed windowless house was always to be discerned. The Acropolis at Athens, Rome, on her seven hills; the cities of Hissarlik, Tiryns, Argos, etc., are illustrations of the hill-top origins of the Mediterranean and more Oriental cities. The Roman capital, as seen from Mt. Palatine, and the Acropolis at the time of Hadrian, illustrate the history and early importance of the hill as a settlement place.

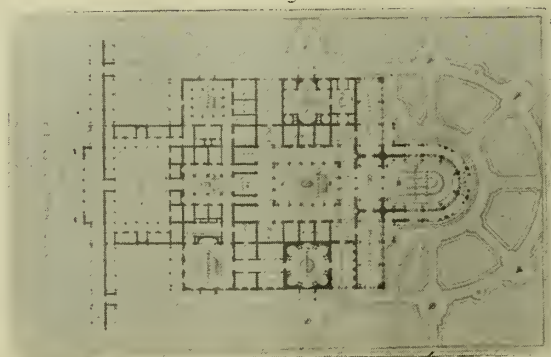


FIG. 2.—Ground-plan of a rich Roman house.

Italy was settled by invasion, and this emphasized the need of protection from enemies. The huts of the invaders were round, built close together, and surrounded by wooden palisades. They were usually on piles; they were of bushes or clay, and 10 or 12 feet in diameter. The need of more room was first met by making the round hut into an oval one, or better by bulging out the top. The materials being mostly inflammable, fire was also a great enemy, and the rain made ugly gullies between the huts and undermined them. Increase of wealth helped to change the round or oval hut into a square one, and widened the spaces between them; but, as pressure increased, the two walls of adjoining houses were made into one partition wall, and thus the street, with continuously adjoined houses, came into being.

Especially in Italy there was a medical fact that dictated the location of towns upon hills. The lowlanders were sickly, had ague, or as it was called, malaria, while the highlanders were more free from the pest.* It was not a very conscious plan, but the healthy, on Darwinian principles, soon "inherited the earth," or got it somehow.

The better and larger Mediterranean house always preserved certain peculiar characteristics, especially the windowless outer walls, and the open central court. Air and light were obtained from this court. How it worked out in the houses of the wealthy may be seen in the ground-plan of a Roman rich man's house, *è. g.*, that of Petronius (of *Quo Vadis*) and in pictures of similar Grecian interiors. The warm, sunny climate permitted this type of house, and encouraged it.

North of the Alps the climate was cold, cloudy, foggy, etc., and the open court in the center was impossible, and if lit at all, the northern house had to get its light through the outer walls. In attempting to shut out the cold air, however, as glass had not been invented or come into common use, the air itself was shut out, and also the light. And from this comes the tragedy of our civilization. Upon this central fact we must keep our attention fixed if we would understand the history of the house, and one of the chief miseries of our life.

If transplanted north of the Alps, the Mediterranean type of house soon died out, because not adapted to our needs. In fact, we Teutons had to begin all over again, and went about it as did the earliest savages and preclassic hut-builders. How did they go about it?

Ingenuity was wanting in the Cliff-Dwellers of Arizona, and great labor was necessary to replace it. Enemies, here as well as in Greece and Italy, compelled them to seek the hill-tops, or the cliffs, or caves. Also for protection from enemies, the lake-dwellers had to build their huts on piles over the water.

*A suggestive book has lately been published: "Malaria, a Neglected Factor in the History of Greece and Rome," by Ross, Jones and Ellitt. "The Conquerer of Greece was not so much the Macedonian or the Roman as that great tyrant which now holds half the world—malaria."



FIG. 3.—The most simple and primitive of all houses, the Negrito house of Luzon, Philippines, yet the trees, rafters, etc., are visible.

But here should be noted the fact that governs almost all primitive hut-building, and the entire subsequent history of the house: Animals and men are parasites upon the plant world. The plant can make its tissues out of the sun, air, and inorganic earths in which it is rooted. The animals and man can not do so, but must construct and nourish their organs from the materials wrested from the vegetable world. So in the other great building work of mankind, the house is only to be made by materials furnished by plant-life. Not even the most artificial of civilized houses can altogether forego the



FIG. 4.—Moro house (Philippines) under construction at the St. Louis Exposition. Note the forks and rafters.



FIG. 5.—The Moro tree-house does not differ from that built upon the ground.

sapling and tree; its fashions, at least, are derived thence, and the early huts and the houses generally, of the past and present, are stamped with the seal of the tree. Keeping that in mind, we have an explanation and a revelatory insight into the history of architecture, and of civilization itself, which is a product of architecture. The Negrito houses of Luzon, Philippines, are the simplest in the world, but the trees, rafters, etc., are plainly seen. A Moro house, as illustrated in St. Louis, shows the forks of the rafters, seen also in the Moro tree-house.

The lake-dweller's house was made entirely of pales, saplings, trees, and was covered with brush,—thatch, or grain-stalks. In the

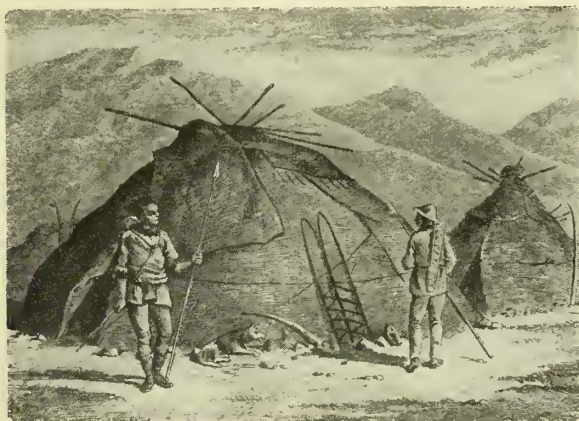


FIG. 6.—In the rigorous climate of the Esquimaux the poles are covered with the skins of animals.



FIG. 7.—In hot climates the house may become nothing more than the roof.

most rigorous climate of the Esquimaux the always visible poles are as necessary, but the cold compelled them to use the skins of animals to make it warmer. When the climate is very hot, and enemies are not about, the hut may be only a roof, as with the Indian on the Amazon, or among the Queensland aborigines. When the enemies are avoided by the hill-top protection, and when domestic animals are kept, the Philippine method is excellent. The importance of poles, as well as of thatch, and better constructive skill is shown by the Bakiris of South America. In China today millions of people are living in ingenious houses, but all upon the same plan. Where the summer is hot and the winter cold, as among the Kamchadales, one family may have one or more houses elevated on piles, and another below to protect from the cold. To keep their grain, etc., the Ainhus of northern Japan make elevated store-houses. Protection by palisade walls is shown in this village of the Bechuanas in Africa, and there is the beginning of a street. The beginning of a second-story house, the need of great protection from enemies, and considerable building skill, are all exhibited by the Arfaks of New Guinea, and all three



FIG. 8.—If enemies are avoided by hill-top protection and domestic animals are kept, this (Philippine) method of house-building is adopted.



FIG. 9.—With superior constructive skill the Bakiris of South America make better huts, also out of poles and thatch.

also among the Tagals of the Philippines. This well-made house of a Hova chief in Malagassy is noteworthy; there are three or four stories, an excellent roof, many rooms, roof and gable windows, etc. But do not fail to notice the V-shaped extensions of the rafters at the extremities of the ridge-pole.

Three occupations have come down to us from the earliest barbarisms, and are today persisting among us the same as throughout all human history. They are that of the savage, that of the charcoal-burner, and that of the soldier. And their house building epitomizes and illustrates the history of each. The savage, note well, preserves



FIG. 10.—The ordinary Chinese peasant house is constructed on the same principles with similar materials.



FIG. 11.—The African Bechuanas protect their similarly constructed houses by palisade walls.

the most primitive and make-shift style, appositely illustrated by the house of our own North American Indians. Columbus had no kodak, but we know the Red Man's tent of that time was a sorry affair. That of a modern chief is much "smarter," as he could get his canvas from civilization's looms. Poles, and always poles, are to be noted! In the progress of time the poles became more scarce, or the charcoal-burner* wanted a better-protecting house; but he had no mind to change his architectural style, and he built his cone-like teepee tent of stone. The chimneyless neighbors needed charcoal to burn

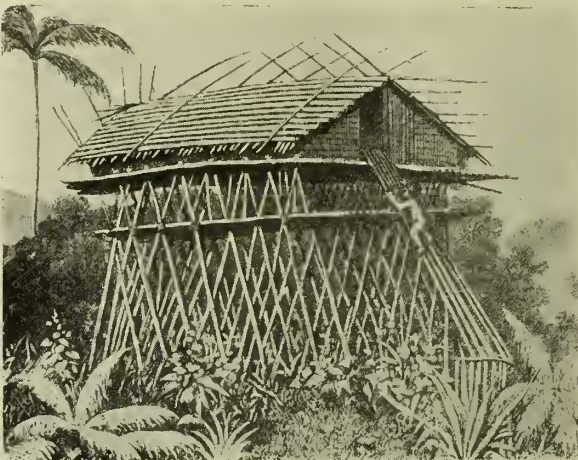


FIG. 12.—The Arfaks of New Guinea make their houses as all others have done, but secure protection from enemies by mounting them on poles high in the air.

*For a more detailed setting forth of the "Evolution of the English House," see the excellent book with this title by Sidney O. Addy, Swan Sonnenschein & Co., Lim., whence I have taken some of the following illustrations.



FIG. 13.—Note the forks of this well-constructed four-story house of a Hova Chief of Malagassy.

in their houses, to make horseshoes with, and to make transportation more easy; but they did not change their house-shape for thousands of years. So powerful is tradition and fashion, that there are perpendicularly-walled houses still standing whose doors and window-jambs still lean backwards. The house of the soldier illustrates and epitomizes the entire history of the race; at first, as in the invaders of Italy, it was a mere roof, or a round and thatched cone, or poled teepee tent, like that of the Indian, and this has come down to us as the form still existing. But as the round European village houses were perforce compressed into squared ones, so the most modern military tent, which all have seen, has become square. But it is single-roomed, of course, and one-storied. Some of the best are



FIG. 14.—The red man's teepee tent; the canvas is supplied by civilization's looms.



FIG. 15.—The oldest house, that of the charcoal burner (England); it is a teepee tent in stone.

beginning to show the beginnings of perpendicular side walls. A photograph of a part of the camp during the recent Manassas maneuvers shows all three styles of house or tent in contiguity. That with rafters alone at the left, that of the round or teepee fashion, and the squared style with upright side walls.

The fact of the rafters is the most fundamental in all early house-building. The side walls are late devices. The primitive house was essentially rafters, and these old and ever-new savages, our soldiers, best preserve the tradition of the entire history of the race. The building of a house was the beginning and means of gaining security and power. The man who could say, *This is my house*, was the leader and lord of others. And the best house made its owner the best man. The primitive house was made of four poles, leaned, crossed, and bound together, two here and two there, at the top, the



FIG. 16.—The modern military tents preserve the traits of all the oldest types of houses.

points, when crossed, sticking out like the letter V. These two letters, V, on the coat sleeve of a corporal, are called chevrons, and literally and etymologically mean rafters; they show who was first honored with military office. If the primitive householder had such a big and fine house as to have three sets of rafters, he was the sergeant. If later he had a gable-window, he was an orderly sergeant. If he had one-story only, the lieutenant had no bars to his shoulder straps; if he had a second-story, he got one bar there, and if a third-story was his boast, he was made a captain, with two bars on his shoulder. Thus little traditional customs like buttons and bands summarize, for the evolutionist, the long-past history of the race. "The ontogeny repeats the phylogeny."



FIG. 17.—When poles, etc., are not to be found, other materials were used, but the pattern remains the same. Whites' early monastic settlement at Skellig, Michael Kerry, Ireland.

When poles and wood were accidentally not obtainable, and when exigency commanded, the round hut was patterned with great difficulty, in other materials,—as, *e. g.*, in the huts on the seashore of the whites' early monastic settlements at Skellig, Michael Kerry, in Ireland.

Such remains, and the huts of the charcoal-burners and the teepee-tents of the soldier, are the relics of survivals of the round-hut period of our remote ancestors. It was early replaced by our Teutonic forebears, by the square style. More room was needed for the cattle, and so the rafter poles were merely widened out laterally and the round room or hall became oblong or square. This fashion was aided by the fact that the sparse population were surrounded by forests. Tacitus found the Germans living their lives, singly, in the woods, or in small communities,* and their descendants have preserved better than other peoples this separatist habit. From this cause flows their prolificity and ascendancy over others. Their seclusions and independence taught them virtue, some cleanliness and

*"Colunt discreti ac diversi, ut fons ut campus, ut nemus placuit," he says.

freedom from disease, etc., things that crowded folk can never learn or know. This is the genuine reason for Anglo-saxon supremacy in the world.

The Greek and Oriental house was, from the first, built for the purpose of housing people, not cattle. In the mild climate the cattle could run loose or be herded. In the north they had to be housed; that is the reason for the two types of houses. Today the Japanese house and every room in it is made so that the floor space may be exactly covered with tatami or mats, all of the same size—3x6 feet—the exact size required for a person when sleeping. The Greeks and other Oriental nations had a similar unit of measurement of floor



Ireland

FIG. 18.—The Oratory of Gallerus, still standing in ~~England~~. The shape of this house, in stone, is the same as that made by bending sapling trunks and tying the tops together.

space and house size called a κλινη, about $2 \times 1\frac{1}{4}$ meters. This word κλινη, indeed, later became the word for bed, and is the original of our word clinic, polyclinic, etc. The Teutonic house, on the other hand, was built for housing domestic animals, the cows, horses, etc., and every occidental house bears many signs of its origin, of the forgetfulness of ventilation and light, whence spring our so-called house-diseases.

At first our domiciliary ancestors bent their sapling trunks together, and did not cut them down. Hence the rafters were curved. There is actually standing today at least one type of such a house in Ireland, the so-called Oratory of Gallerus. But it is in stone! How difficult must have been the building! But tradition and fashion dictated. An interesting illustration of the continuance of this type of house, in its half-way stage, was given in a late issue of the Popular Science Monthly. It is the house of the Chuckchees, a tribe inhabiting the extreme northeastern coast of Siberia. The base walls



FIG. 19.—Siberian Chuckchee house, half stone, with pole rafters covered with skins.

are stone, with a wooden frame above covered with skins. Note the poles appearing as rafters.

It was early found that saplings of the first houses must be about 16 feet apart, and the two at the other extremity were also 16 feet apart. This had been found the necessary width for stabling horses, cows, etc., when facing each other. For thousands of years the problem of the domestication of these animals was the all-controlling one with the Teutonic peoples, and the house was in reality a barn, built not primarily for the man, wife, or children, but to protect and control the cows and horses. Such a 16-foot house was called a bay,



FIG. 20.—Enlarging the old house by adding part of a "bay," and extending the roof over it. A house at Burscough, England.

and late in the middle ages houses were bought, sold, and deeded by the bay, half-bay (8 feet), quarter-bay, two-bay, three-bay, etc. When the house was enlarged by a half-bay, it was at first by a makeshift bulging or swelling, illustrated by the picture of a still-existing house at Burscough, England. When, later, your recent ancestors could have a window in it, they, and we, called it a "bay-window." Every kitchen in the land, being an afterthought, is a half-bay addition, and every house shows how bays, across, or at the end, half-bays and quarter-bays, have been added. Every house we see is written all over with its own thousand-year history. Our greatest of great grandfathers filled the walls of his "bay" with

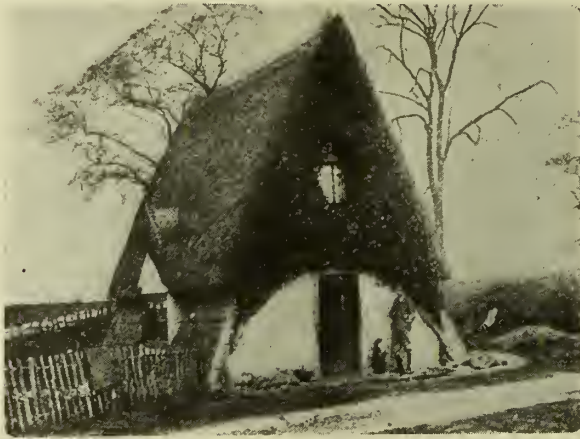


FIG. 21.—When the sapling-rafters were cut off at the ground, they ran straight to the ridge-pole. "Teapot Hall," Scrivelby, England, still standing.

poles, brush, straw, peat, etc., and later with mud, stone, and finally with brick, etc. Vitruvius says, "First men erected forks, and weaving bushes between them covered the walls with mud."

The entrance door to the ancestral house was necessarily at the end and beneath the gable, facing the east, or the best light, windows being unknown. The ridge pole laid in the forks was the origin of our "16 2-3 feet make one rod, perch or pole."

When little trees were not left growing or standing in the ground, but were cut off, the rafters, of course, went straight, not curved, from the ground to the ridge-pole, and the house was shaped in cross-section, like an inverted letter V. An example of such a house is "Teapot Hall," Scrivelby, near Horncastle, England. The chimney is of recent date. The "space" at the angle near the floor, too small except for storing grain, etc., to enlarge which was one incentive for beginning the perpendicular side wall, and also to give better standing room, by elevating the rafters and the roof. These spaces

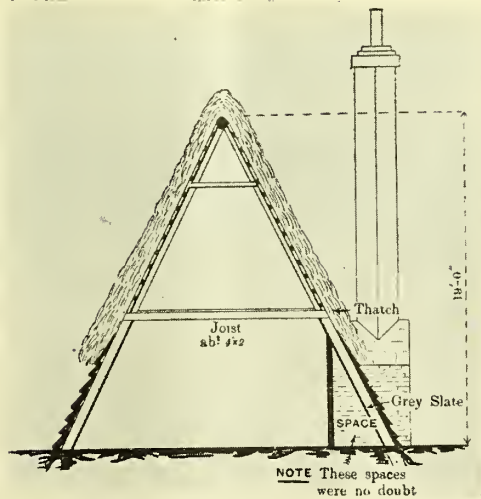


FIG. 22.—Cross-section of Teapot Hall. (The chimney is modern.)

finally grew into little rooms. The addition of rooms was also gained by utilizing the spaces about the old fire-place, or hearth, and partitioning them off for the pantry, scullery, etc. Finally such a degree of luxury was reached that the richer could have a double house, one end being used for the human beings, and the other for the animals, with some partition between the two. The ox-house or barn was thus separated from the fire-house or hall, so-called.

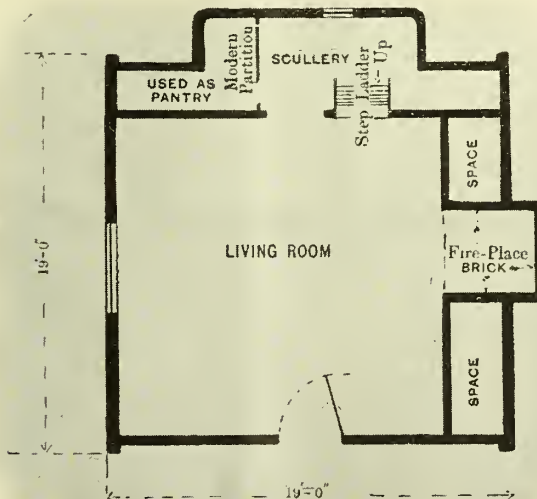


FIG. 23.—By elevating the roof and making perpendicular side walls, the waste spaces, etc., were utilized and more room gained.

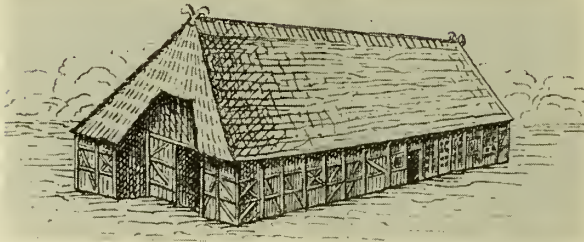


FIG. 24.—Typical Frisian or Saxon house, primarily an "ox-house." (The forks are becoming ornaments.)

The passageway between the two was the threshing floor, or simply "the floor," or thresh-hold. Hence our modern word "threshold." It was also called the entry. The typical Frisian or Saxon house, still widely used, is essentially the same as the old English, with slight improvements.

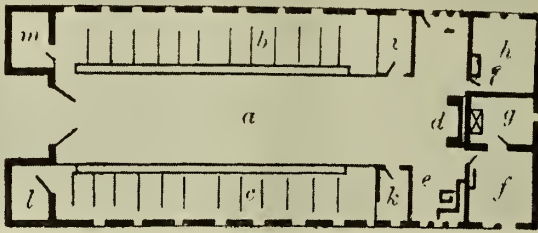


FIG. 25.—Ground-plan of Fig. 24, showing the combination of ox-house and fire-house or hall.

The inside of the original one-roomed house of all early times is illustrated by a mud-walled house still standing at Great Hatfield, England. The walls are two feet thick. The "speer" was a screen protecting from the drafts of the door those sitting about the hearth.

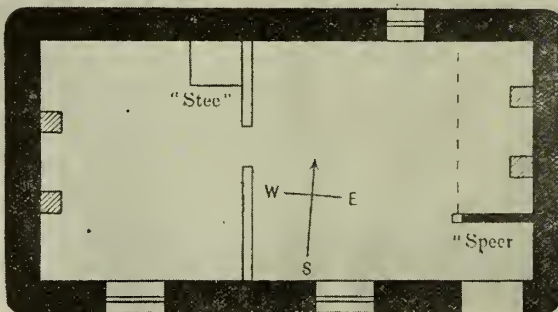


FIG. 26.—Mud-walled house, still standing at Great Hatfield, England. The walls are two feet thick. The "speer" is a screen, protecting from drafts; the "stee" is the ladder to the upper story.

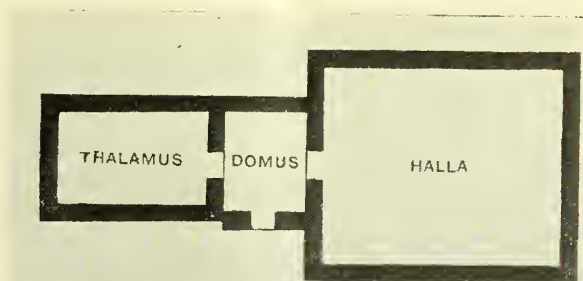


FIG. 27.—Method of adding a living-house to the hall by a half-bay. Kensworth Manor House.

The “stee” was the ladder going up to the upper story, which was five feet high. The doorway and lower room of all old-time houses was about six feet, showing that few men were as tall as that. A living house was added to the ox-house by a sort of half-bay. It is illustrated in the old Kensworth Manor-house. A more common way was that carried out by the owner of a house at Burscough. A half-bay chamber was added behind the hearth-stone, another at the opposite corner, with a buttery, and,—a remarkable fact,—a “latrina.” The English word *hall* has always denominated the single large original room of the one-roomed house. As, one after another, parts of this space were partitioned off, the women’s “bower” first, and then other rooms, there was finally left only the tiny part of the house we now call “a hall.” It is all that is left of the noble English hall.

The greatest step in advance in the history of architecture was the addition of upright vertical walls, whereby the roof was raised, space inside increased, and the second-story made possible. It was doubtless a slow process, and the manner of effecting it is shown in the section of a barn at Bolsterstone, England. The tie-beams were lengthened outwardly, and long beams, the pons or pans, were laid, the rafters placed between the pans and the ridge-tree. The sides were then built up with stone, mud, brick, etc., shown in a barn at Treeton,

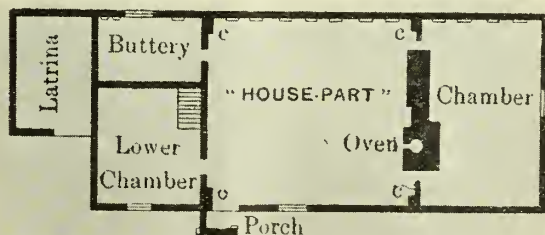


FIG. 28.—A half-bay chamber was added to this house behind the hearth-stone, another at the opposite corner for the buttery and “latrina.”

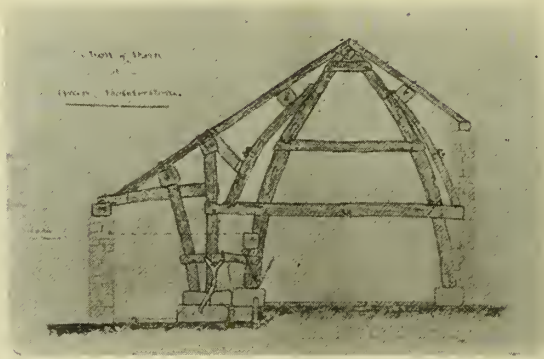


FIG. 29.—Method of making upright sides or lower story walls and increasing the room space. Barn at Bolsterstone, England.

England. Often the old wooden structure was entirely covered by the new walls, as is shown in the “crucks” of a demolished house.

Until sawed boards came into common use there were no floors, and no second stories. Wood was plentiful in the middle ages, and while it was so, split oak tree trunks were used as posts, tie-beams, etc., and as walls set closely together. When timber became scarce the spaces between the timbers were enlarged and filled with the cheaper materials at hand. The closeness of the timbers is thus a criterion of early date. Finally concrete, stone, brick, etc., became the entire walls. Wooden and stone shingles came into use in the 14th century. The transformation of the “stee” into the stairway, or the perpendicular ladder into the slanting staircase, was slow, and is illustrated by the picture of a stair at Upper Midhope, in which the first five steps are perpendicular, while the upper ones are inclined a little, and supplied with a hand-rail. The stairway was often

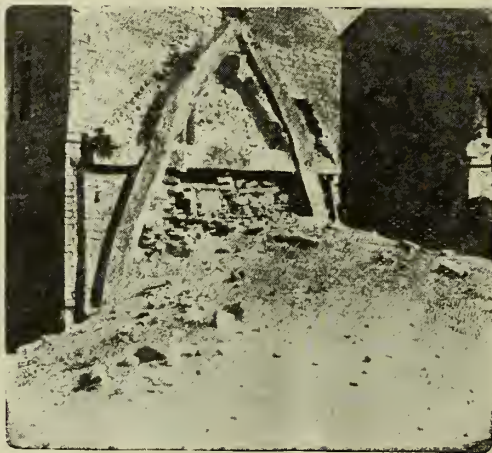


FIG. 30.—Photograph of a demolished house with the old crucks built about with new walls.

on the outside. Two story-houses began to appear in the 12th and 13th centuries. Wainscoting began in the 13th. Tapestry had long been used by the rich as protection for the beds from the drafts and dampness of the thick stone walls, and also, later, as ornaments. These tapestries finally and recently became wallpaper, pasted on the walls, although still advertised as "paper-hangings." As late as the 14th and 15th centuries the hall-floor was not boarded, but was made of packed earth, sometimes with flagstones. Upon this floor straw or other litter for beds was thrown, especially about the sides.

The cheerlessness of these dark halls or homes made men seek a common meeting place at some neighbor's house, who could afford

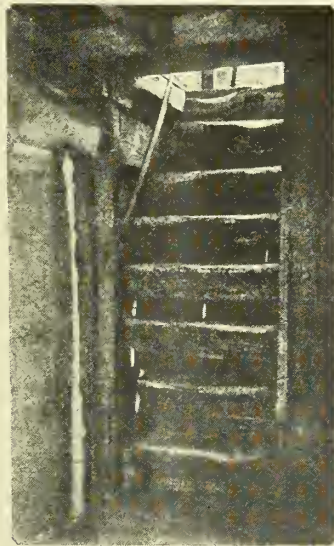


FIG. 31.—The ladder to the upper story in process of becoming a stairway.

a better fire and seats, and perhaps better wine or beer, and thus gradually grew up the village inn, the beginnings of our hotels and drinking "saloons." The allurements of these modern places show how history repeats itself.

The struggle for warmth dominated the history and development of northern civilization. In all the previous history of animal life it had also been the controlling necessity, and nature had secured the requisite and uniform 98.6 degree temperature of the human body by a thousand means and devices of which we are ignorant. Man carried on the struggle against cold chiefly by the house. He could not get his body well and properly clothed, and so he and his family and his animals were huddled together in the warm hut, which was made as air-tight as possible. There was but one door, no windows, and few air holes. The heat of his cattle's bodies also helped to lessen

the cold. As late as the 16th century the house was called the "fire-house," suggesting the recent introduction of the fire-place, an improvement over the hall without a fire.

The primitive chimney was a hole in the roof for the escape of the smoke of the fire-place or hearth. That the smoke penetrated the whole house is evident from Chaucer's line of the "Nonne Prest:" "Full sooty was hir bour, and eek hir halle." The meats and many kinds of foods were hung over the heads of the people below,—the origin of our smoked hams, bacon, dried pumpkins, corn, etc. The custom still exists in many farm houses of our country and time. Turf and charcoal were the more common kinds of fuel, and the dull-red glow gave the only light to the family sitting about it. The poet Spencer, in describing the typical delver of medieval life, says:

"At last he came into a gloomy shade,
Covered with boughs and shrubs from heaven's light,
Where as he sitting found, in secret shade
An uncouth savage, and uncivil wight
Of grisly hue, and foul, ill-favored sight.
His face with smoke was tanned, and eyes were bleared;
His head and beard with soot were ill bedight.
His coal-black hands did seem to have been seared
In smith's fire-spitting forge; and nails, like claws, appeared."

The first improvement in chimneys was a sort of projection or hood over the hearth, with a half-chimney leading, first, towards, and later to, the hole in the roof. Improvements followed until the true chimney was built without or in the house wall, at first only to the roof, with slits for the escape of smoke. Finally it reared its head above the roof. A board or space above the hearth and chimney was used for the hats, and beneath it were the hooks for hanging the mantles to dry, whence our word "mantle-piece." "On the borders of Russia there are still to be found by the chance traveller, or the peddler from Archangel, many Savu-pirrti, or smoke cottages. These have huge open fire-places, a pleasant feature, one would say, in a frigid land, where timber is unlimited.

"But, alas! they are without chimneys, and the smoke which has no escape, save chinks and crannies, settles under the roof to be driven downward by small drafts. From this cause many of the dwellers in these homes become blind. The idea of the 'smoke cottages' was taken centuries ago from the neighboring Letts."

Personal cleanliness of body for one or two thousand years was practically unknown or unthought of in all Europe. Michelet says that for 1,000 years of the middle ages not a man or woman in Europe took a bath, and this is undoubtedly a very conservative statement. A large portion of Americans do not bathe more than once or twice a year. There was probably very little of clothes-washing in the early times among the better classes, and none among the lower. Doubtless two if not all three of the kinds of lice that are parasitic upon the human body were borne about by almost all men and women. Flies were everywhere. Latrines were at first unknown and even in comparatively modern times the few best of them

were as bad as our worst today. Bedbugs were in every bed so-called, or miscalled, even in the best and most costly.

Physicians well understood how such conditions made it inevitable that contagious diseases were everywhere prevalent, and prevented the increase of population which came at once in the last one hundred or two hundred years when a little personal and household cleanliness, and freedom from lice, checked the multiplication and dissemination of the germs which caused the scourging infections which cursed the long dark history of 1500 years.

The water supply in olden times was always difficult and usually impure. The "pits" for latrines were dug near the walls, and oblivious of the conditions of drainage. The existence of a spring or well doubtless caused the location of house or castle near by, as a primary need was always water.

The history of domestic architecture and sanitation in England makes it plain that progress in these things was almost exclusively due to the initiative of the king, and then spread to his nearest underlings, thence to the richer of the private citizens. One must not err, however, in thinking that the example thus set had many imitations until the last century or two. In the reign of Henry the Third, the first attempt at underground drainage was made. The kitchen refuse, dirty water, etc., had been carried through the great hall at Westminster, until, in the language of the King's Writ, "the foul odors arising from them seriously affected the health of the persons congregated at court," and an underground drain was devised to carry them into the Thames.

The first conduit of water was established in London in the 13th century, but long after this the water-carriers hawked water about the streets.

In old manuscripts and chroniclers of the Arthurian stories, water for washing the hands and face was brought to the guests after the removal of the armor, and before the feast. In the later middle ages there were a few houses which had, *in the screens*, as it was called, a lavatory or washing place, with a cistern of water and a sideboard or recess. Edward the First introduced the luxury of baths, and in some houses of the next century there were *cameræ privatee* of a very crude kind. These "Garde-robés" or "privy chambers" were usually in the best houses of the 14th century, but of course without drainage, sometimes with pits, sometimes without.

"Eating off the same board," or platter, was the rule, i. e., one plate served for all. Our modern custom of taking wine with one another, or from the same glass, is a survival of the old custom. The English said grace before and after meals.

The custom of bringing basins, ewers and napkins to the guests before the dinner, prevailed up to the last few centuries. After the meal the hands were washed again; the food was handled with the fingers, and the second washing of the hands was thus made necessary. The dining table was made of board laid upon trestles. The

meal over, the boards and trestles were taken away. The seats were wooden benches. Two meals a day was the rule; dinner at about ten or eleven, and supper at five. Knives and spoons came into use about the 14th century and forks much later. In the time of Richard III. the noblemen pulled their knives from their wallets when they began to eat.

The table was set near the wall, the diners usually next to the wall, the front of the table open without seats, for the approach of servants. At great feasts, jesters, mimics, musicians, etc., amused the company. The chief ornament of the dining table was the huge salt-cellar, set in the center of the boards. Next to it in importance was the "ship," or "nef," a dish in the shape of a ship for holding spices and sweetmeats. The "castor" of our childhood days is probably its modern representative. The mazer bowl completed the "china" outfit,—a large vessel from which all drank in common. The meats and other foods were placed either on the table or on wooden plates. The bones and refuse food were thrown by the diners at the dogs hungrily awaiting their share of the feast. Wooden trenchers, the first form of plates, are preserved as relics in England today, hollowed on both sides, and then it was turned over for the pudding. They show, of course, no signs of the use of knives and forks. The fingers made no marks!



FIG. 32.—From a piece of Bayeux tapestry, showing Harold's Manor House, with outside stairway, etc.

The modernness of the kitchen is shown in the fact that in old pictures the cooking is represented as carried on in the open air outside the hall, and even now the baking, even in the United States, is sometimes done in ovens outside the house. In common life the hearth or fire-place had been and long remained the sole cooking and warming place. An old picture of Rosham Church and Harold's Manor House, at Bosham, in Sussex, from a piece of Bayeux tapestry, is particularly illuminating. The outside stairway, the dogs waiting for bones, the drinking horns, impossible to be cleaned, all speak of the manner of dining of our ancestors for many centuries.

Henry VIII. issued an ordinance against his scullions lying about naked and filthy. The Courtiers and Commoners stank so that

Wolsey kept an orange filled with salts against the pestilent air, Erasmus ascribes the plague and the sweating sickness to filth, especially to clay floors covered with rushes under which were buried beer, grease, bones, excrement, etc. Thomas à Becket was blamed with luxury because the company room had fresh straw every day. Queen Elizabeth's room had straw. In 1680 the courtiers went to Potsdam on stilts because of the mire and filth.

The development of the church building is not a part of our subject, but may be glanced at. The word church itself shows the history; it meant simply the lord's house, or the ruler's house, and it was naturally the town hall, public hall, or basilica of the district or community. It was at once a temple and court of justice, the place where the local council met. The forms of these buildings are the same as those of the pagan basilica. The old English word *castel*, or *castle*, meant *village*. The watch-tower, for keeping watch or guard over the country about, was on the highest point, whence the signals of danger were given and received. The church tower was also used as a watch-tower, raised on high above the lord's hall for the same purposes as the watch-tower. The original use of the bell or bells in the belfry was to guide travelers home in dark nights, a light also aiding. The bell was also used to summon the burgesses together, and for sundry other purposes. The churches were thus the only public or municipal buildings in English towns during the whole period of the middle ages. They were at first, and for a long time, used not only as courts of justice, but as places of resort for the transaction of any kind of business. The markets in Europe are often still about or in front of them. Jesus drove the money-changers out of the temple. The history of the church has been in one respect a decline of secular power, until now the church building is used solely for religious purposes. The royal arms have at last been removed from all English churches, but the origin even of the most ornate is clearly the hut of boughs or poles. Take the belfry or watch-tower away from many a dear little English church, and the added "half bays" from the hall, and the original bay or hall is the beginning form. Do you think those crosses on the steeple and at the ends of the ridge-poles are Christian in origin? They are thousands of years older, and are the Vs or forks of the rafters made into ornaments and transformed symbols. The old Swede's church at Wilmington, Delaware, shows a quaint transition form, with its living room in the belfry, its watch-tower, its quarter-bays, etc. The most ornate cathedral, if it could be traced back, would show, in its evolution, the tree, the rafters, and the core of the single hall. It is plain that the church tower or belfry is the old round pole tent set before and fused into the later "hall," become church.

Our American domestic architecture is derived from English models. At the first there was extreme simplicity as in the little house of Myles Standish, with its double-pitched roof—a still common proof of the difficulty of raising the roof and getting a second-

story. The later open-air verandahed southern style of the summer and warmer climate, as illustrated in Washington's Mt. Vernon house, shows how the fresh air and shade was sought, without adopting the aula of the Mediterranean house. Because we are English and Northern, the hall could not be forgotten, and the central pillared court was, as it were, put on the outside. In Mexico the house returns frankly to the Mediterranean model. The climate invites the patio or open central court. In New England the rigor



FIG. 33.—Washington's Mt. Vernon house, the open central court of the Mediterranean house, is, as it were, put on the outside of the house.

of the climate forced the addition of numerous bays, and half-bays, and brought the kitchen, woodshed, barn, etc., into unity and under one roof. All are frequently connected so that the farmer or housewife does not really go out of doors in the severest weather to attend to the cattle, horses, hens, etc. It has taken us a thousand years to get the barn separated, and at a distance from the house, to which it was long united; and at first house and barn were all one, as we have seen. In the South, even now, the kitchen often remains a separate building.

So long as the family living room and the ox-house remained one hall, the men slept sometimes over the cattle; if there were two rows the men slept on one side, and the women on the other. When there was no hayloft, men and women slept on the floor of the hall, and, of course, immorality was encouraged.

We spend one-third of our lives abed, and yet few take sufficient thought of the history of the provision of wise bedding. What we call a bed was unknown to our ancestors. By our term bed we mean a bedstead. We still admit the power of history in the term "feather-

bed," but the feather-bed introduced into England from France in the 14th century is today almost obsolete. What we call a mattress, our forefathers called a bed. The frame work, raised from the floor, upon which we now place the mattress and bedding, was unknown to the common people of the time of Shakespeare and Chaucer. The bedstead is not used by the refined and cleanly Japanese people. The English mattresses or beds were often expensive and elaborate, with the richer classes, covered with rich stuffs and quilted. Pillows and bolsters were also of the same materials. This is shown in their careful mention in the wills of Shakespeare, and even in those of nobles and kings. In all primitive times, even with the rich, and down to later centuries with the poor, the bedding was made of dried rushes, ferns, heath, hay, straw, leaves, boughs, etc., laid upon the floor next the walls of the hall. Writing in 1678, Aubrey says that in English houses, "when night came, straw, dried rushes, heath, or dried ferns, were spread upon the floor; and those unprovided with beds or couches laid themselves down each under the bench or table upon or at which he or she sat." The more comfortable (but always removable) mattress, or feather-bed, etc., was a step in advance. The development of the bedstead is a long story and a most interesting one. I regret that I can only epitomize it here. Cleopatra had an ornate bed and bedstead. The richer Greeks and Romans had narrow or single couches, their *triclinium*, or dining-bed, used about the dining table in the day, and as sleeping couches at night. As civilization crept northward and riches began to produce comforts and prides, people grew tired of sleeping upon the floor, upon straw, or even upon mattresses. In the 16th century ox-houses there were beds, blankets, sheets, mattresses, pillows, etc., but no bedsteads. The big family chests for linens and more precious holdings were used as a sort of bed at night, and possibly this gradually developed into a sort of bedstead or raised basis for the bedstead. The "bedstock," a movable structure, followed; a later stage was what we now call a "bunk," the bedstead built into the room like a steamship berth. Then followed the enlargement of a part of the room as a bedstead, a sort of room within a room. The size of the bedstead was increased to a "double bed," and soon the exigencies of cold and space, and the natural desire to raise the bed above the dirty floor, brought about the bedstead as we know it, for the whole family. And not only for the family, but for the guests and strangers. As riches grew there were three bedsteads, the so-called "Trinity," that for the lord and his immediate family; that for the closer attendants, and lastly that for the lower servants. The great bed of Ware, now at Rye House, Broxbourne, Herts, was a monster, and monstrous. For a time the cult of the bedstead was fashionable, and great sums were spent upon its construction, furnishings and ornamentations. Two causes operated to form the custom of having curtains about the bed, the protection from cold draughts, and the desire for privacy. The state bed of George IV.,

designed by Heppelwaite, shows the extreme, and our American colonial four-poster was a better bad. It is remarkable that the growth in manners and morals so long permitted the use of one bed by several persons. We have today reduced the number to two, and our "double bed" still lingers as a barbaric relic of our barbaric origin. The history of the bed is a sad one. The Orientals, and especially the Japanese, solve the problem much better than our occidental civilization. Until metal might replace all wood in the bedstead, our ancestors, had they kept their floors clean, should have slept on mattresses, rugs, etc., placed on the floor. In China millions of people today walk about their huts on little islands of dry ground between which flow the canals of slops and waste water. Our Teutonic and English ancestors were almost as dirty as regards the disposal of waste and the filthiness of their floors. Only the Japanese learned to keep their floors and beds clean. One may suspect that the nomadism and tent-dwelling of the Orientals, with their constant moving about, was largely due to the necessity of escaping from bedbugs and the accumulation of filth. The curse of all Anglo-saxon bedsteads for at least the last 500 or 1000 years has been the bedbug. That little animal has played a role in history that few can understand or estimate, greater, I suspect, than any king or war. Poor Mrs. Carlyle was unable to have much peace of mind or body at least when traveling in the best way in England only fifty years ago, because of this monster of Anglo-saxon filthiness. So long as wooden bedsteads were in use it was next to impossible to do away with the bedbug, even if there was much wish to extinguish him. The English matron had too little wish of the kind. The result was a gradual weeding out of sensitive persons, because of sleeplessness, and the encouragement on Darwinian principles of the existence of the stolid, thick-skinned, snoring, full-blooded sleepers, who had no nerves and plenty of blood for the parasites. The bedbug has had more to do with the formation of English character than climate and food, or any other several causes combined. The extensive draperies and curtains of the bedstead gave further nesting places, if they were needed, for the parasites. The large beds also encouraged immorality, as all readers of medieval literature know. Only in the latter part of the last century has there been some progress in the war upon the bedbug by the plastered and separate rooms, and the single and metal bedstead. The metal single bedstead which can easily be kept clean and free from bedbugs is an important means to a better civilization. Wire spring mattresses are now made that will not "sag" under any load. They may be unhooked, rolled into a bundle, and stuck in a kettle of boiling water. How advisable such a device and such cleanliness! At the recent Sanitary Congress in Glasgow, Dr. Fyfe exposed the horrors of wool-flock, the material used by the poor for mattresses or beds. The rags and old clothes of tramps, the refuse of households and filth holes is dumped into a machine, without any cleaning or disinfection, and cut and torn to a con-

fused mass of fibers and ordure called flock. The water in which a sample was washed was worse than Glasgow sewage,—and 78 per cent, said Dr. Buchanan, of their poor people sleep on beds filled with this dried sewage.

For a thousand or two thousand years the house of our forefathers had been, in colder weather, a dark hole illuminated only by the faint gleams of the hearth-fire of charcoal or twigs, or of the rush-lights and dip-lights which could serve only to make the darkness a little less obscure. It seems strange that life could have attained the poor dignity it had under such conditions. Cataract and blindness, "blear-eyedness" (conjunctivitis), came on early, under such circumstances. Note especially that no civilization, as we understand it, was generally possible. Reading and writing could not have developed into learning, psychical light was impossible without the physical light; it could not have come to fruition without glass windows. No discovery of the ages was of more value than cheap glass. The very word *window*, is a pathetic proof that it was the need of ventilation and not of light that begot the device. It means *wind eye*, or wind hole, its main purpose being to admit air instead of light. The loop-holes, or lowp-holes of old English barns, being narrow vertical slits, or little holes, show the same explanation. Among the Norsemen there were no such lowp-holes in the walls, but there were *louvers* or holes in the roof covered with the caul of a new-born calf. This showed the need of light rather than of ventilation. In England in the late middle ages the wall holes became "fenestralls," and were a kind of framed blinds of cloth or canvas. In the time of Henry VIII. linen was used which had been dipped in oil. Some glass had been a little used in the great houses from the time of the Romans, but it was so dear that even two or three hundred years ago the panes in smaller houses were very small and some of them were made of wood, cloth, etc., others in the same sash being of glass. In the 16th century the rich vied with each other in having large and numerous windows. But even then glass windows did not pass to the heir as part of the house but only to the personal representatives. They were movable casements easily taken out. The smaller the window the older the house, is still a rule of judgment in English architecture. The window tax in Continental Europe, levied down to our own times, is an evidence of the sad stress of life, and the brutal necessities of government. The window tax was repealed in England in 1851. All early windows were hinged; sliding window panes are modern.

The history of civilization as related to the house may thus be summed up as consisting of four epochs: 1. That of securing protection and warmth by means of the single-roomed, windowless hall; 2. That of the creation of the chimney; 3. That of the making of glass windows; 4. That of securing ventilation; and this is the stage in which we are now living and shall live for centuries to come.

From the beginning of history the greatest obstacles to the opening up of new nations, especially in tropical and semi-tropical coun-

tries, and the spread of civilization, have been malaria and yellow fever. Malaria chiefly dictated the location upon hills of the Italian settlers, with a multitude of subsequent social customs and laws. Among savage peoples it has been a no less dominant factor, and in new countries it has crippled the energies of the people and sent millions to death, each century. Malaria has been the great ally of barbarism, the enemy of social progress, the unconquerable foe of medicine. With its quinin the profession had long waged a losing battle, but now the victory is possible to science, for it was a battle, if we had but known it, against—the mosquito!

The malarial parasite is conveyed from man to man through the agency of the mosquito, of the genus, *anopheles*. The mosquito receives into its stomach from man some blood containing the parasite, which forthwith goes through certain developmental changes, and in the end the germs make their way to the salivary gland of the mosquito, and thence get transferred to a new victim. The mosquito is not only the carrier, but also the intermediary host of the malarial parasite during an important part of its life-history. These facts have been ascertained by immensely patient work on the part of Laveran, Grassi, Celli, Ross, Manson, etc.; the steps gained by reasoning and by microscopic investigation have been confirmed by two carefully planned experiments. Five people spent the worst months of the year in a highly malarial district in Italy, taking no quinin and living out of doors except when the mosquitos feed; i. e., just before sunset and in the night. At these times they were carefully protected by wire blinds to their windows and doors, and mosquito curtains around their beds. They had no malaria. The second experiment consisted in feeding mosquitos of the *anopheles* group on patients suffering from malaria in Italy, sending the infected mosquitos home, and letting them feed on two of the heroic investigators, who forthwith had well-marked attacks of malarial fever.

In league with malaria has been its powerful and faithful neighbor, cholera, or yellow fever, more daring, dashing and suddenly killing. Since 1793 the disease has been the cause, in our country alone, of no less than 100,000 deaths, 41,348 of which occurred in New Orleans, 10,038 in Philadelphia, and 7,759 in Memphis. Between 1853 and 1900 it caused 35,952 deaths at Havana. Since the practical application of the knowledge gained by the work of Reed and his associates the disease has been practically eradicated. And yellow fever is also due to a mosquito. To the everlasting honor of the United States, and of American medicine, the role of *stegomyia fasciata* in the transmission of yellow fever was established by American physicians, and thus the certain way made clear of ridding the world of the horrible disease. There is no hero in the world's work more deserving of honor and monuments than the noble martyr, Lazear, who allowed himself to be bitten by the infected mosquito, well knowing that his probable death would substantiate the truth upon which so many lives depended. He died of the disease twelve days after his sublime test had been made. Dr. Walter Reed, the American boy of whom we are all

proud, planned and carried out the investigation which established the great truth. The profession and the nation owes him honor and the splendid monument now planned.

The relation of yellow fever and malaria to the house is evident. In most new tropical and semi-tropical countries the entire question of ill-ventilation, upon which ill-health depends, has been dictated, unconsciously of course, but not the less absolutely, by the mosquito. The aim has been to exclude the malaria, or bad air, and especially at night. About one-half of the lives of the inhabitants was spent in doors. But with the air came the deadly mosquito. Now night air is purer than day air if the mosquito is excluded, and so the poor blunderers excluded both the good air and the bad air, and lived in an air made foul by themselves. The last Baedeker ordered travelers in Italy to shut the windows at night. What all should have done, and Baedeker should have known for the last several years, was that a mosquito netting should have been used, the good air freely admitted, and the bad air blown out of the sleeping rooms. How slow we are to recognize the problem and face the truth is illustrated by our recent experience in Panama. After a ludicrously false and expensive start there, our government has at last recognized that housing and sanitation are the primal necessities. We can not dig the canal with dead men.

Perhaps the work of the common housefly has been as death-dealing in propagating disease, and *musca domestica* is everywhere, North and South. In January and February of 1905 there were a quarter of a million deaths in India from plague, and it is possible that the flea is the carrier of the germs of this disease just as the mosquito is of malaria and yellow fever. The bedbug is said to be an American invention, but all Oriental nations are tormented by the flea. Even the Japanese mats are filled with them. A commission of eminent scientific men is investigating this problem.

In all northern nations the struggle for warmth, and the expense of heating houses, brought about the same ill-ventilation as did the mosquito in the more southern climes. The vast majority of houses in Europe and America are stench-holes and breeding places of disease because of the foul air of badly ventilated rooms.

The two causes combined have thus brought about the century-long habit of badly ventilated houses in the entire civilized world. The better class of householders, by means of attention and wealth, have been able to secure good ventilation and cleanliness through a hundred devices and by the waste of much heat. With all the devices that architects and engineers have made, the heating and ventilation of our homes is too expensive, too wasteful and too blundering. One of the greatest benefactors of mankind will be he who will enable a poor family to heat its house and at the same time supply it with pure air at one-tenth of the expense now demanded. It can be done, and must be done.

For what does ill-ventilation mean? It means a hundred minor diseases and types of ill-health encouraged, and the consequent

preparation of the soil for the terminal diseases which invite Death himself. But more than all else it means the direct production of those diseases of the lungs which cause almost one-third of all deaths. Bad ventilation means pneumonia and consumption. As to pneumonia it has in late years been increasing so fast and becoming so deadly that in many cities the death-rate is greater from it than from consumption. But what is the ultimate cause of pneumonia? The late Commissioner of Health of Chicago truly says that it is "a disease of modern architecture," i. e., of ill-ventilation and filth. One million people die in the world every year from tuberculosis, or about 3000 every day. Ten million people in the United States, now living, will die of the disease. Every third or fourth adult now dies of consumption, and as a whole about every seventh death is caused by it.



FIG. 34.—The "Home" of a million children.

In coughing the consumptive emits several hundred million bacilli every 24 hours. It has been said that 98 per cent of people have some tuberculosis. And all these deaths are due to the house, its bad ventilation, and the over-crowding, etc., which goes with it.

Cold, darkness and filth—these are therefore ancient enemies of our life and happiness. The struggle of ages has been against cold, and to secure an air-tight house. By means of plastering and glass windows it was at last secured; and also the light necessary to banish the more evident kinds of filth. But tragedy ran through it all because it was not seen that air may be really the filthiest and the most dangerous of all filthy things. In that blunder is our civilization now caught, and the great duty of physicians and philanthropists generally is to undo the terrible mistake. In the entire history of the past the greatest and best educational influence in the

lives of the young was the home. But in the great city there are no homes. The tenement and the apartment houses can not be called homes in any true sense of the word. Next to the home in molding the child's mind were the playgrounds, the garden, orchard, fields and woods, to which the boys and girls could fly. All this for the child living in great cities is also gone. The new education, to some extent and in some poor ways, is seeking to bring back to the child these lost most valuable things. The city kills the home.

In New York City there are about 350,000 people living in 40,000 tenements without windows opening to the outer air. The results are shown in the statistics of death and in the wretched people. In Philadelphia, the city of homes, there is scarcely a windowless room, and there are about 300,000 separate dwellings. But we dare not forget that however far away we allow indecent living, our filthy sin will be punished by disease. Any one of us may be, and all of us together, will be punished for the acts of a diseased sinner in Butler, Pa., or in Ithaca, N. Y. Preventive work is a state affair and can be undertaken on a large scale only by municipal and state authorities. Scattered families may know enough to sleep with windows open, but a window opening on a foul air-shaft, or into another close and dark room, is still a thousand miles from the ideal. The "spit-cup," the disinfectants, the paper napkins and bags, which are burned up, are within reach of the thousands; but they will avail little when the whole building is rotten and reeking with infection. For wide streets, sanitary houses, and systematic disinfection, we must look to boards of health, tenement commissions, city councils and legislatures. Each of us, therefore, is responsible for the sorry but bettering condition of things in New York City.

In the famous "lung-block," the uncleared walls and floors were the best places for holding the germs of tuberculosis bred by the millions by the former dying occupants. It housed nearly 4,000 human beings, and in nine years 265 cases of tuberculosis have been reported from it. In Chicago they have a rival of the "lung-block," called "Consumption Row." One hundred and thirty-eight cases of consumption received at the Cook County Hospital in the last four years, came from this block. And yet the deaths from tuberculosis are in some small cities twice as great as in New York City. The City of Philadelphia has much to be proud of, and much to be ashamed of, but if it is in politics "corrupt and contented," its people, of all in the world, are the best housed and in this way contented. It is proverbially the City of Homes. It has solved the house-problem the best of all. A typical Philadelphia, or model house, for workmen's families, rents for from \$10 to \$16 a month. That is what is wanted in every city and village of the land.

Among the most far-seeing attempts to deal with the tenement house problem is that of the establishment of tenements on a plan uniting sound business principles and charity, instituted in Washington, and especially that of Mr. Henry Phipps in New York, who has

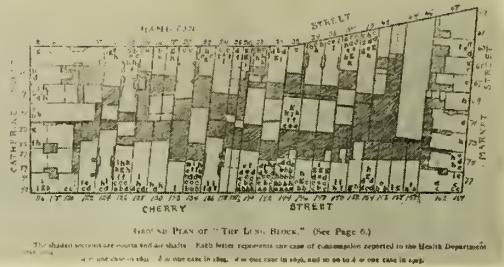


FIG. 35.—The famous “Lung Block,” housing 4000; in nine years 265 cases of tuberculosis were reported from it.

given a million dollars, the rents to go to extension of the system. The negro population, foolishly and suicidally excluded from many



FIG. 36.—“Consumption Row,” from it 138 cases of consumption were sent to Cook County Hospital in four years.

districts and otherwise unjustly treated, is included in Mr. Phipps' noble scheme. In this, said to be the most perfect tenement in the



FIG. 37.—Tenement house built by Henry Phipps, combining “business,” charity and hygiene.

world, light, air and sunshine is in every one of these two, three and four-room suites.

But, of all the peoples of the world, the Japanese have solved the problem best. And that is the cause of their success, and of their coming success in all the world's work. All success, national or personal, rests upon health; and health depends upon the house, the purity of its air, its cleanliness, physical, personal and social. A typical Japanese house has plenty of air and light; it is far cheaper even than the Philadelphia model; it is what no cheap house in civilization is,—beautiful! Three pairs of sapling tops were crossed in its original construction! The Japanese have learned how to clothe the body and keep it warm while keeping the air of their houses cool and pure. The air of all our houses and cars is too warm, and is impure. The poorest Japanese has plenty of light in his house; our poor have none. There is no filth on their floors, in their yards, or closets, while our people, even the well-to-do, are usually filthy.

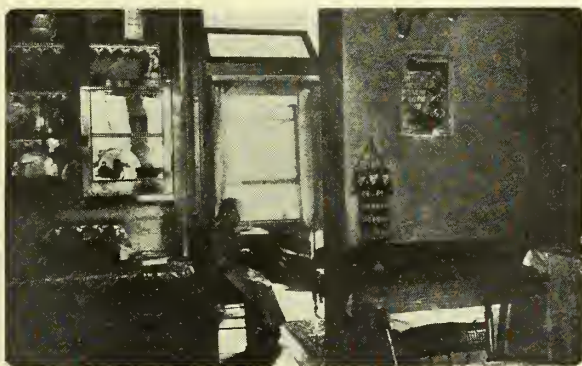


FIG. 38.—Kitchen of a three-room suite in Phipps' Tenement; rent, \$3.50 a week.

The Japanese have no "beds" and so they have no bedbugs and other bugs. In every farmhouse of our land the air is dead, the windows closed, the rooms dark and stuffy. And so our death rate is far higher than that of the Japanese. They also have compulsory vaccination, while we allow the wild fools of anti-vaccination to kill thousands every year and maim thousands more. The Japanese and the Finns bathe the body daily. How is it with the rest of the world? And with all our money and "public works," we can not put pure water into our houses. At least 50,000 of our people are killed each year by unnecessary typhoid fever, and the unnecessary disease costs us about \$100,000,000 a year! Before we leave the Japanese house we should note that this first of all warlike peoples exhibits the first systematic and successful attempt, as Major Seamon has shown, to save its soldiers' lives and health and to win battles by so doing.

The housing of its citizens, especially of the more impoverished, should be the vital concern of every municipality, and of every good

citizen. No house should be built except upon the advice of an expert in sanitation. Every architect should be held by law to have made a thorough study of the methods of modern preventive medicine. Health boards should be strengthened, paid, and well paid, then held accountable for the diseases that should have been prevented. If one could speak to the lay world he should say: "Take the medical profession into your confidence and your service. Abolish your selfish quacks. They build no hospitals, except to cheat you and your sick. They do not care for or believe in preventive medicine; the



FIG. 39.—A typical Japanese house, cheap, clean, airy, well lit, beautiful.

less of it the better for them. That is the distinction between a good physician and a quack. The first labors without pay to extinguish his own calling, to commit professional suicide, by preventing the diseases which kill you. The quack knows nothing and cares less for that; and yet you allow Eddyism, osteopathy, patent-medicine drug stores, vibralogy and infinite tommyrot to crowd your physician friends out of practice, and you pay your quacks a hundred times what you pay your medical friends. What a shame! And your death rate could easily be reduced 50 per cent, and your morbidity rate 75 per cent."

As to tuberculosis, it is a curable disease, and the establishment of special sanitariums is to be encouraged. Even the roof of ordinary hospitals in the city may be used, and if that is not obtainable, life out-of-doors at home is curative. Consumption hospitals, like that at Denver, should be built where it is high and dry and sunny. Cold is no disadvantage, and even snow, as at Muskoka, makes no difference in the cure. Expensive buildings are not at all necessary, as a tent may serve the same purpose.

But hospitals, sanitariums, and even home treatments, are not the chief needs of the hour. Climate, we are learning, is not the sole or chief requisite in the treatment of tuberculosis. The segregating or traveling treatment of disease is only a makeshift. But if hospitals and sanitariums tend to become permanent ends in themselves, they can grow into evils. Sunshine and pure air are needed, but abolish smoke and dust, and sunshine and pure air may be had even in New York City. Social conditions, extreme poverty, uncleanness, bad ventilation, etc., in the home create disease. The cure is not to take the patient away and leave the bad house to reproduce new patients who are again to be taken away, and so on forever. The cure is to make every house a sanitarium and a hospital and a home combined. The aim of every true physician is to prevent disease as well as to cure it. Consumption can even be cured at home, and it can always be prevented. Sanitarium life can be carried too far. If it neglects the reform and the prevention which can be effected in the home-life, it may become an evil. All the sick can never leave home to be cured, but all the homes can be made healthful, and when so made, disease will be prevented.

We need, therefore, in every house these fundamental things: Pure air, pure water, pure sunshine, pure love. In the greatest of all historic struggles, that for the creation of the home, these things have too long and too sadly been neglected, or found impossible to secure. Even in the best of modern homes they are, in part, too frequently wanting; in the majority they are amazingly absent, and in the worst they are replaced by foul air, germ-laden water, darkness and degradation, which breed disease and increase the death-rate. Air, water, light and love are possibly the most abundant blessings of the world, and civilization—so-called—has made them the hardest things to obtain. Ours the duty, the necessity, the pleasure, to remould our domestic lives so that each shall have them in splendid profusion. As it has ever been, the family is the elemental and primal unit of society; the home its out-working, and the house its mechanism. Upon these rest the health, dignity, nay the salvation, of social existence, that dream of Christian ethics and religion, the kingdom of God on earth.





